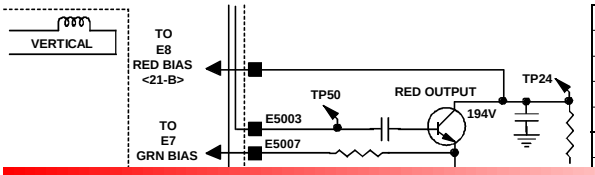



TECHNICAL TRAINING

# ATC010

# Technical Training Manual

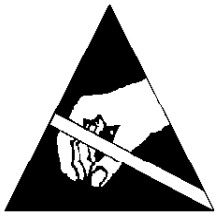
TTE

# FOREWORD

This manual provides the service technician circuit information and troubleshooting steps to be used while repairing the ATC010 chassis. It is intended as a training tool and is to be used in conjunction with the ESI service information. As with other training manuals, circuit description is represented with partial schematics and not all components in a circuit are listed.

# SAFETY INFORMATION CAUTION

Safety information is contained in the appropriate Service Data. All product safety requirements must be complied with prior to returning the instrument to the consumer. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damages and may expose themselves and others to possible injury.



All integrated circuits, all surface mounted devices, and many other semiconductors are electrostatically sensitive and therefore require special handling techniques.

First Edition - First Printing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Technical Training Department, INH905
PO Box 1976
Indianapolis, Indiana 46206 U.S.A.

# Contents

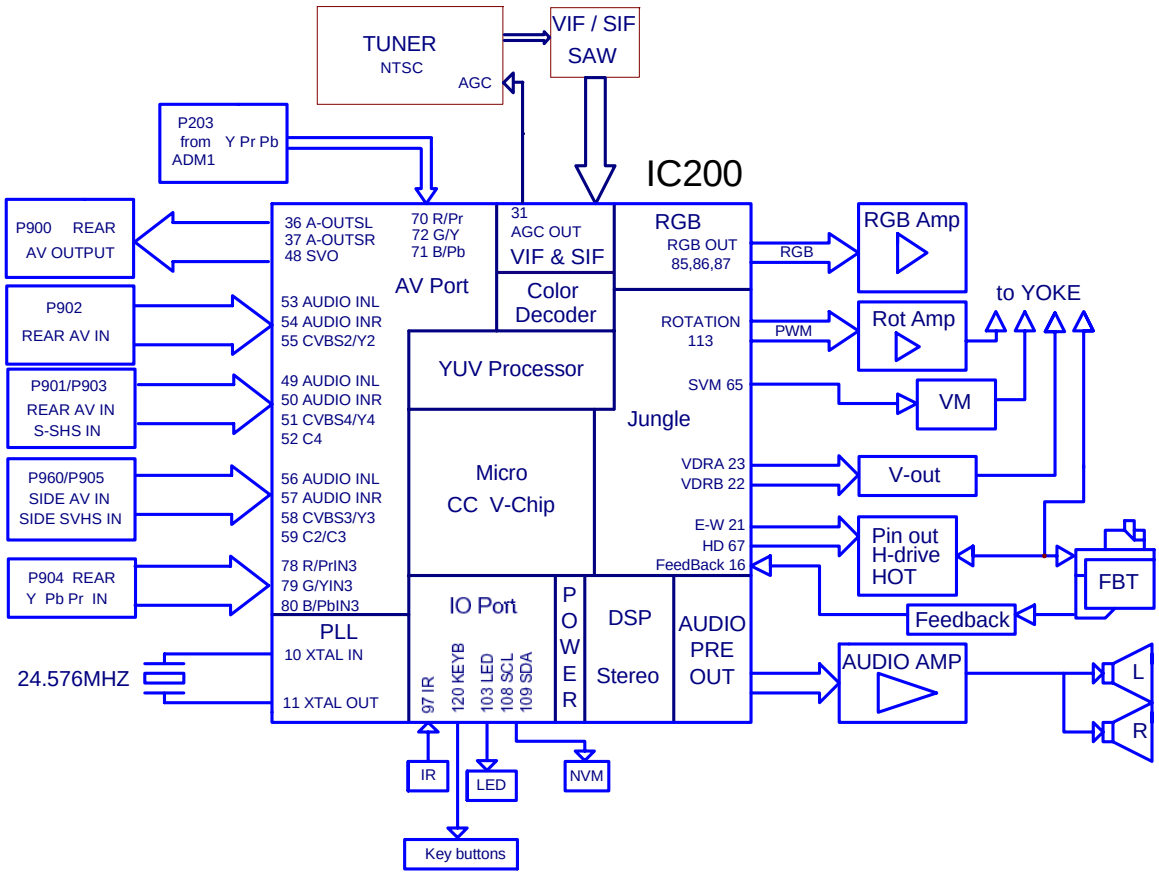
# Overview

The ATC010 Training Manual covers the key circuits found in the new ATC010 chassis. These circuits include:

- Standby Power Supply
- Run Power Supply
- System Control (ALL-IN-ONE Processor)
- Horizontal Deflection
- Vertical Deflection
- Shutdown Circuits
- ADM1 Module

This new chassis combines previous NTSC technology with new High Definition technology. This combination allows HD programming to be received and displayed on a standard NTSC (4:3) set. It also combines all processing and switching into a single IC package the ALL-IN-ONE Processor.

The ALL-IN-ONE Processor is just that a single IC that handles all video switching, audio switching, deflection processing, video processing, audio processing, and system control functions. The only processing not performed by this IC is the ATSC signal tuning and decoding.




**ATC010 System Block**

ATSC decoding and receiving is performed on the ADM1 module. This module receives and processes high definition signals and converts them to a format used by the chassis.

Troubleshooting procedures covering key circuits is also provided in this manual. These key circuits include:

- Standby Power Supply
- Run Power Supply
- System Control
- ADM1

Each troubleshooting procedure is a step by step circuit verification process. Knowledge of the circuit is critical to following these procedures. It is recommended the servicing technician become familiar with the circuits before using the procedures to troubleshoot the ATC010 chassis.

# Standby Power Supply

The standby power supply in the ATC010 is operational when ever AC power is applied to the chassis. The supply operates with an AC voltage level between 108V to 132V. It is a switch mode power supply that generates the +5VSTB voltage from the 120VAC input. This voltage is further regulated to a +3.3VSTBY that is used by System Control and other circuits that require standby voltage.

The heart of the standby supply is IC860 switch mode controller IC. IC860 uses voltage mode control and Pulse Width Modulation (PWM) to drive the power transformer T860. Voltage mode control is at start up when the voltage on pin 1 passes the start level of IC860. The PWM frequency is determined by the time it takes for the transformer to demagnetize and an external RC network on pin 3.

**Start-up**

Startup of the supply occurs when AC is applied to bridge rectifier diodes D861, D862, D863, and D864. The AC is converted to Raw B+ (approximately +150VDC DC) by the bridge rectifier and C860 filter. Raw B+ is the source voltage for switching transformer T860 supplied by current limiting resistor RT860.

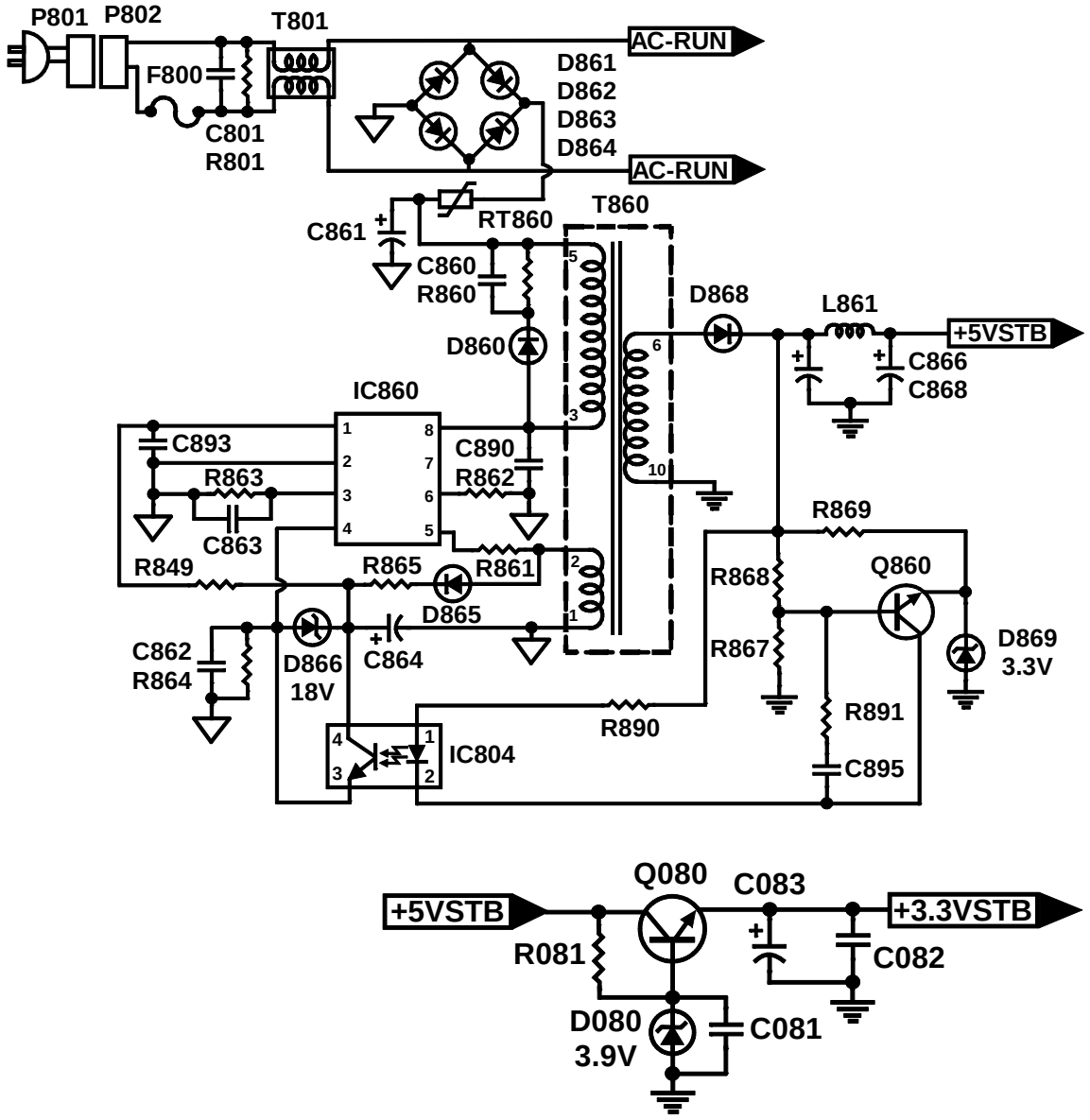
The switching transformer (T860) allows connection of the Raw B+ to the switch mode controller IC through its primary winding between pin 5 and 3. Pin 3 of T860 is connected to pin 8 of IC860. IC860-8 is the Drain supply and startup for the IC. As the Raw B+ increases on pin 8 of IC860, the IC starts to conduct through pin 6 and the current source resistor R862. As the voltage at pin 6 of IC860 increases, over-current is detected shutting down the IC. This releases the stored energy in the primary of T860 to the secondary windings.

The induced voltage between secondary winding pins 1 and 2 of T860 is rectified by D865 and filtered by C864. This voltage is used as VCC for IC860-1 and IC804-4 feedback regulation circuit. IC860 starts switching when the voltage on pin 1 passes the VCC start level. Once this voltage is high enough to operate the IC, voltage from pin 8 (Raw B+) is no longer used to power the IC.

IC860 operates in discontinuous conduction mode. This means that as long as there is a pulse on the secondary of T860, the oscillator (IC860) will not start a new primary pulse. Pin 5 of IC860 monitors the current in T860 and suppresses start of the next cycle while there are still secondary pulses from T860.

**Regulation**

There are two regulation circuits in the ACT010 standby power supply. D866 and the winding from T860 pins 1 and 2 make up the secondary or fail safe regulation and IC804 provides secondary monitoring regulation as the primary regulation. Both are sent to IC860 pin 4 (REG input).



The primary regulation is feed back from the secondary +5VSTB source through opto-coupler IC804. As the +5VSTB increases, current through IC804 (LED side) pin 1 and 2 increases. This increase is detected by the photo transistor on pins 3 and 4 causing IC804 pins 3 and 4 to conduct more. This increase in current is sent to pin 4 of IC860 causing it to limit on time. The output voltage, in this case +5V, is determined by Q860, D869, and voltage divider circuit R868 and R867.

**Over Voltage Protection**

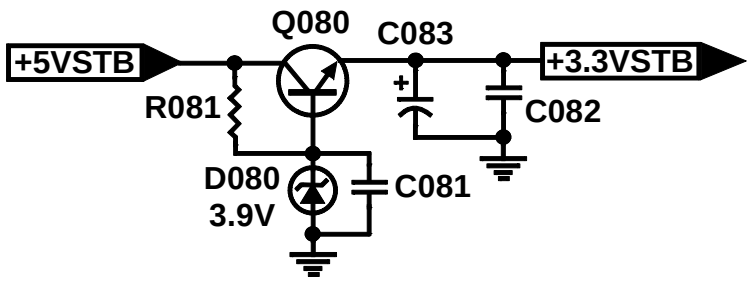
The over voltage protection level is determined by D866. If the primary feed back fails to control regulation D866 will prevent the power supply from reaching unsafe levels. As the voltage increases in the secondary the voltage on the cathode of D866 also increases. Once this voltage reached the break over point of D866 (18V) D866 conducts and pin 4 of IC860 voltage increases shutting down IC860.

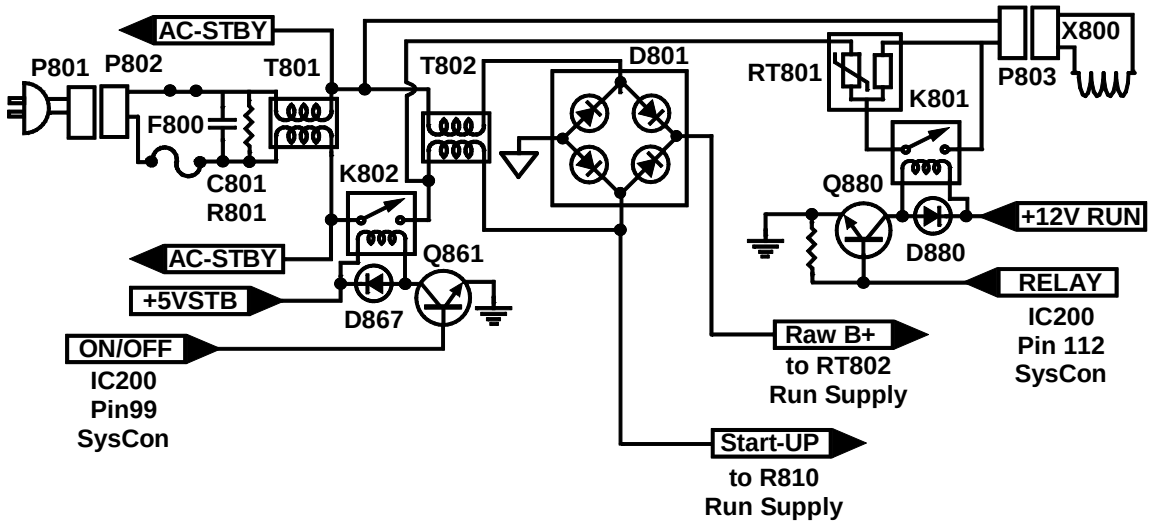
**Over Current Protection**

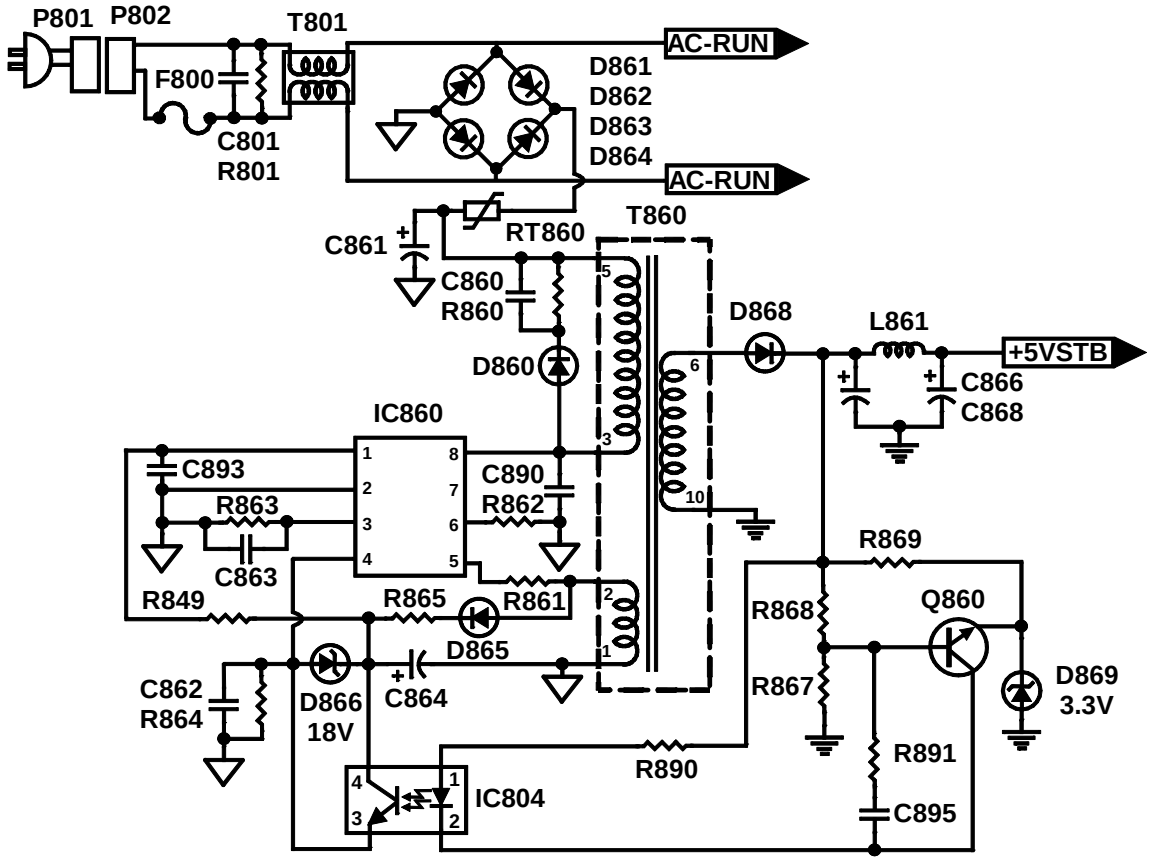
The current source resistor R861 determines the amount of current the power supply can generate. As the current increases in R861, the voltage at pin 5 of IC860 starts to increase. Once this voltage reaches the internal threshold of the IC, IC860 goes into over current protection.

Other protections for IC860 include Over Temperature and Short Circuit Winding Protection. These protection circuits are internal of IC860 and can not be measured. However; they both have unique circumstance that a servicer can use to determine which shutdown it is. First is thermo shutdown, as the name implies, thermo shutdown is temperature related. If IC860 gets too hot, it will shutdown. With this type of shutdown the power supply will run until the shutdown temperature is met and then the power supply will shutdown. Cooling down the IC will resume normal operation of the power supply. Second, the Short Circuit Winding requires a power on reset to clear. Once activated, the short circuit winding shutdown will not allow the power supply to operate until the short is removed. This results in a completely dead power supply (no pulsing or oscillations).

The only supply voltage generated by the standby supply is +5VSTB. This voltage is used to run all standby circuits and is further regulated to +3.3V that is used by system control functions. Relay K802, run supply switch, also uses the +5VSTB




AC-STBY
P801
P802
T801
F800
C801
R801
T802
D801
K802
AC-STBY
+5VSTB
Q861
D867
ON/OFF
IC200
Pin99
SysCon
RT801
K801
X800
P803
Q880
+12V RUN
D880
RELAY
IC200
Pin 112
SysCon
Raw B+
to RT802
Run Supply
Start-UP
to R810
Run Supply


P801
P802
T801
F800
C801
R801
AC-RUN
D861
D862
D863
D864
AC-RUN
C861
RT860
T860
C860
R860
D860
D868
L861
+5VSTB
C866
C868
IC860
C893
R863
C863
C890
R862
R849
R865
R861
D865
C862
R864
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D869
3.3V
R890
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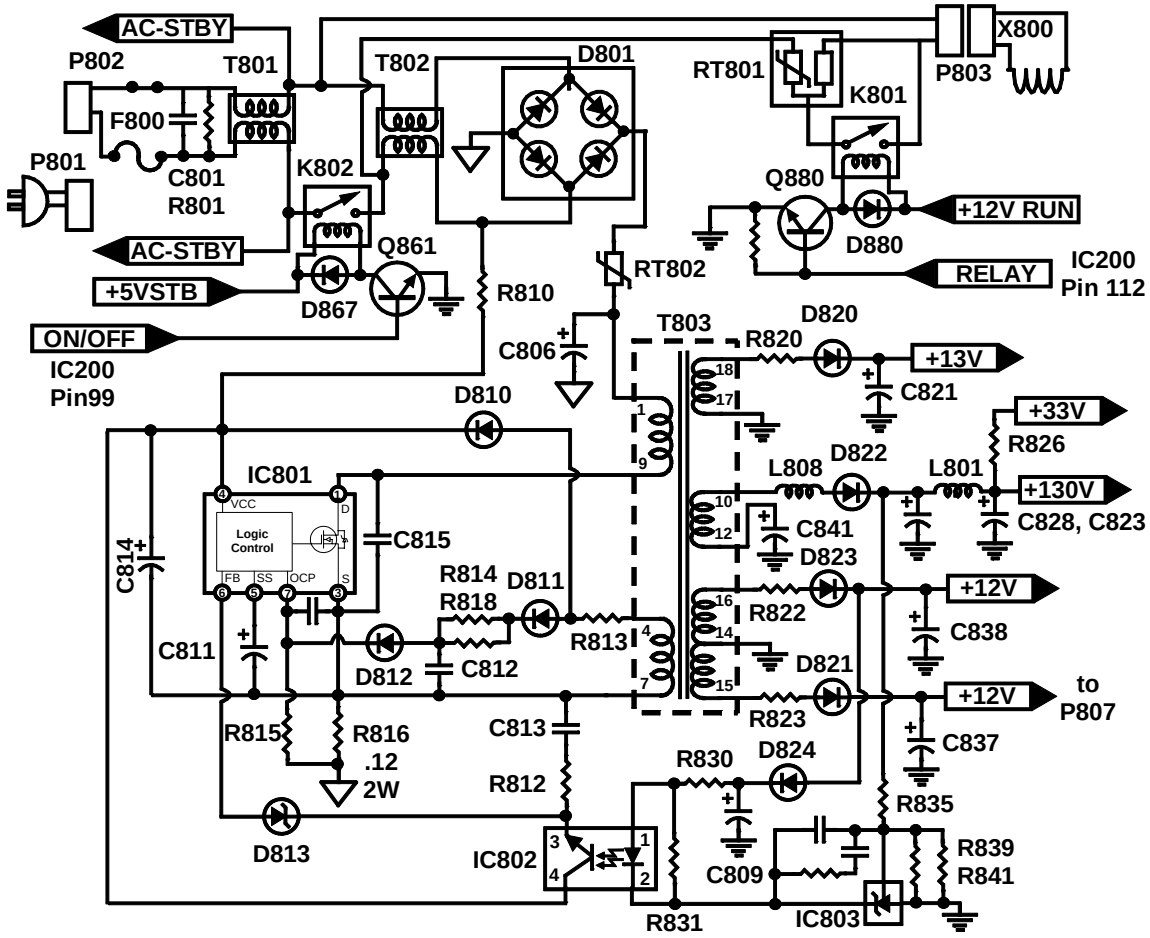
C895
IC804



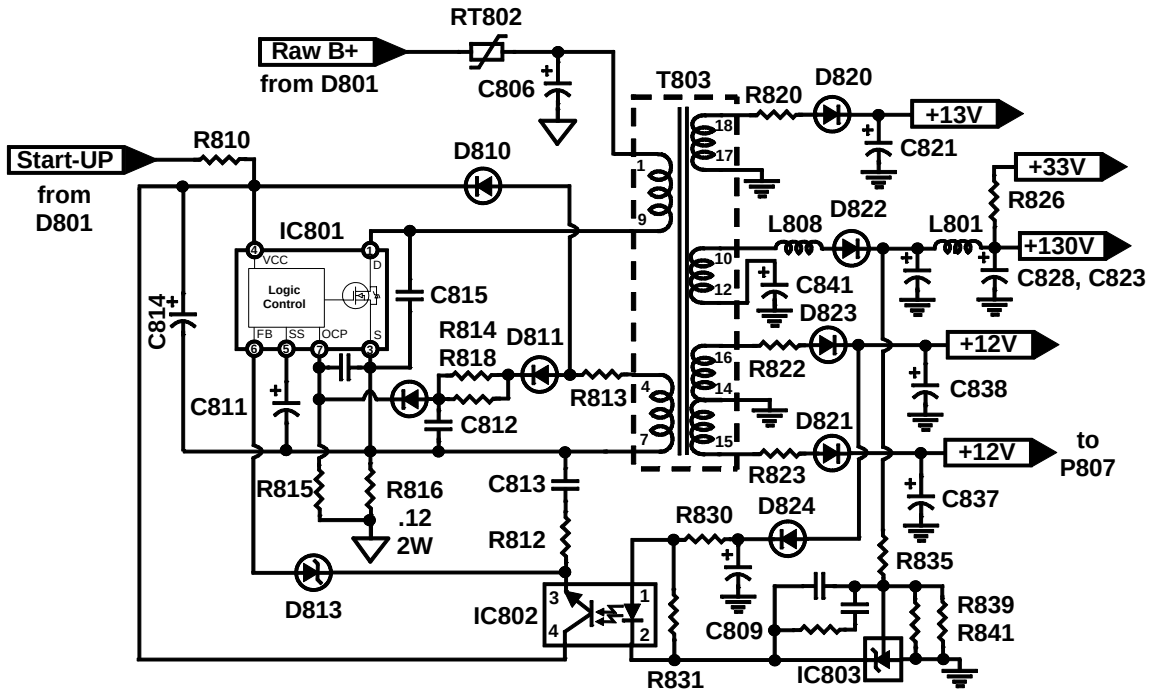

# Run Power Supply

The ATC010 run power supply is a switch mode power supply generating the +13V source, the +33V source, Regulated B+ (+130V), and two +12V sources. It is turned on / off by a relay switching the AC in. The heart of this switch mode power supply is IC801 switch mode controller IC. IC801 is a self starting internal logic controlled switching device that drives the transformer T803.

The run supply utilizes two shutdown circuits and feedback regulation circuit for voltage and current control. Both shutdowns, Over-Voltage and Over Current are monitored internal of IC801 with feedback coming from monitoring the +130V source and the +12V source.

**Start-up**

Once the power on relay is energized and pin 4 of IC801 reaches the start voltage of approximately 10.3VDC, IC801 starts to conduct through pins 1 (Drain) and 3 (Source). Raw B+ from D801 is supplied through the switch mode transformer T803 pins 1 and 9 to IC801 pin 1. As current increases in the source resistor R816, IC801 detects this increase at pin 5 (slow start) and starts the first cycle. The VCC from D801 through R810 is not sufficient to operate IC801. Re-supply for VCC comes




from D810 and the secondary winding of T803 pins 4 and 7. C814 is the filter for re-supply. This re-supply voltage is also bias for the feedback opto-coupler IC802.

**Feedback Regulation**

There are two key components (IC802 and IC803) used for feedback regulation. IC802 and IC803 work together to monitor the +130V source for any changes. As the +130V increases or decrease so does the current through IC803. IC803 allows more or less current through IC802 to occur. IC802 in turn controls the amount of feedback being sent to IC801. IC801 uses this feedback information to control the switching frequency.

Feedback Regulation starts with a reference voltage from the +130V source being divided down by R835, R841, and R839. The voltage from the divider goes to IC803 for reference. This reference voltage is 2.5V and follows the +130V as it varies. Increases in the reference voltage cause IC803 to conduct harder with a decrease in reference voltage causing IC803 to conduct less.

IC803 is connected between pin 2 of IC802 (LED side) and ground. Bias for pin 1 of IC802 comes from the +12V source through R830 and R831. The voltage on pin 2 drops as the current increases in IC803 turning on the LED in IC802. The more current IC803 draws the brighter the LED in IC802 gets. The emitted light is detected by the photo transistor across pins 3 and 4 of IC802. The photo transistor reacts to the amount of light being generated by the LED and conducts more current as the light increases.

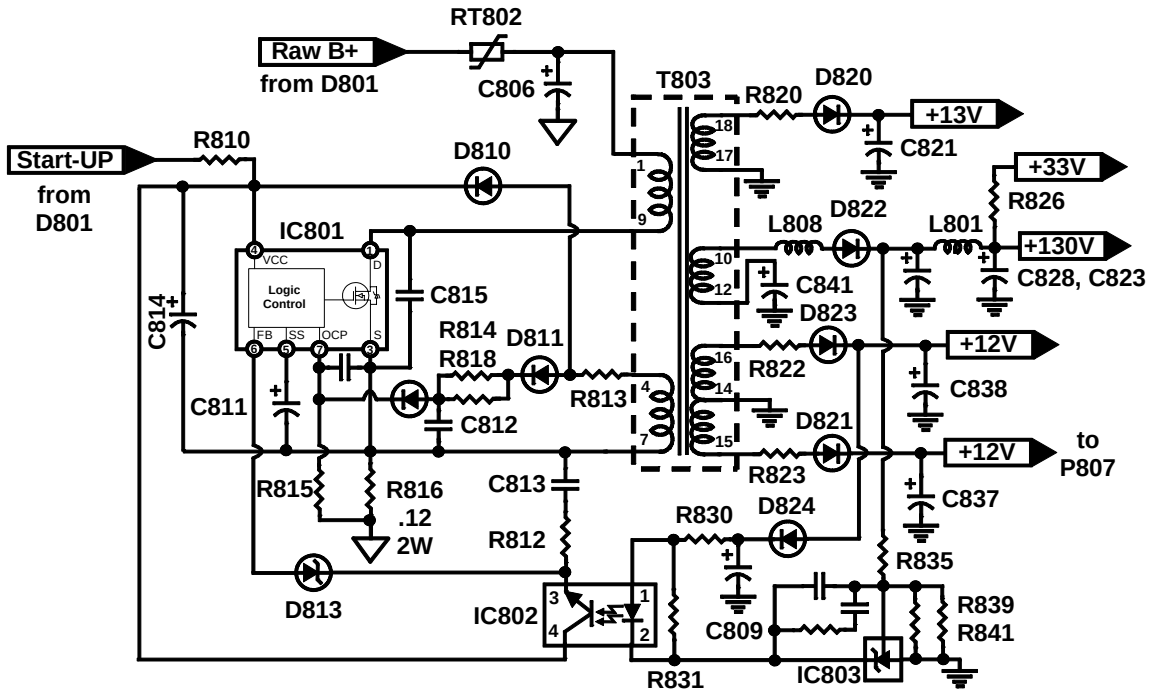
The photo transistor of IC802 is connected across pin 4 (VCC) and pin 6 (Feed Back) of IC801. D813 (6.2V zener) prevents voltages lower then 6.2V from falsely tripping the feed back and shutting down the supply.

**Shutdown (Over-Voltage)**

Over-voltage is detected at pin 4 (VCC) of IC801. Typically the voltage at pin 4 of IC801 is around 9.7V during normal operation. During Over-Voltage shutdown, the voltage will either be below 8.8V or above 10.6V. As the voltage increases at pin 4, the internal monitor detects this increase and shuts down the IC when the voltage exceeds +10.6VDC. Because this voltage comes from T803 pin 4, it is a good representation of what the power supply is doing. Under voltage is also detected at pin 4 of IC801 with the minimum requirements for operation being 8.8V. If the voltage at pin 4 decreases below 8.8VDC, IC801 shutdowns drive.

**Shutdown (Over Current)**

The standby supply is protected from over current conditions by shutting down IC801 when excessive current is detected. Pin 7 of IC801 is the OCP or over current protect pin. Detection is when the voltage on pin 7 drops below zero volts. During normal operation voltage on this pin is .46Vdc.



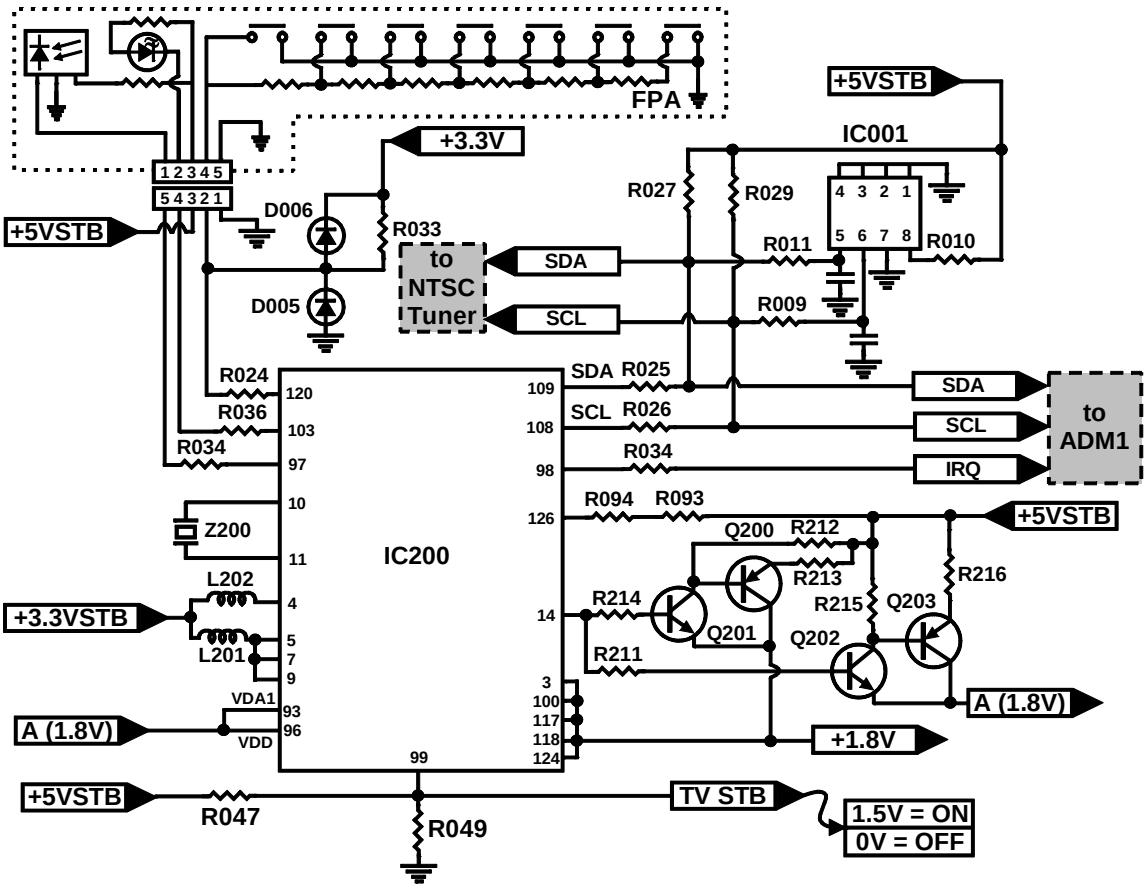
# System Control (All-IN-ONE Processor)

The ATC010 system control is contained in an all in one processor (IC200). IC200 is a 128 pin processor capable of A/V switching and processing, Deflection processing and drive output, Y Pr Pb processing, and CRT drive output (RGB). IC2001 requires several voltage sources because of the different internal processing circuits. These voltage sources come from both standby and run supplies. The following voltages are required by IC200:

- +1.8V
- +3.3V
- +5V
- +8V

Reset for IC200 is in the form of power on reset controlled internal of the IC. When power is applied to the set and the standby +3.3V is in the range of 2.7V to 3.3V, IC200 will reset. There is no external indication that reset has occurred.

The EEPROM (IC001) is for storage of alignment data and customer settings is IC001. Standard IIC bus communication is used to communicate between IC001 and IC200. Other bus communications on the clock and data lines are between IC200 and the ADM1 module and the Tuner (NTSC).

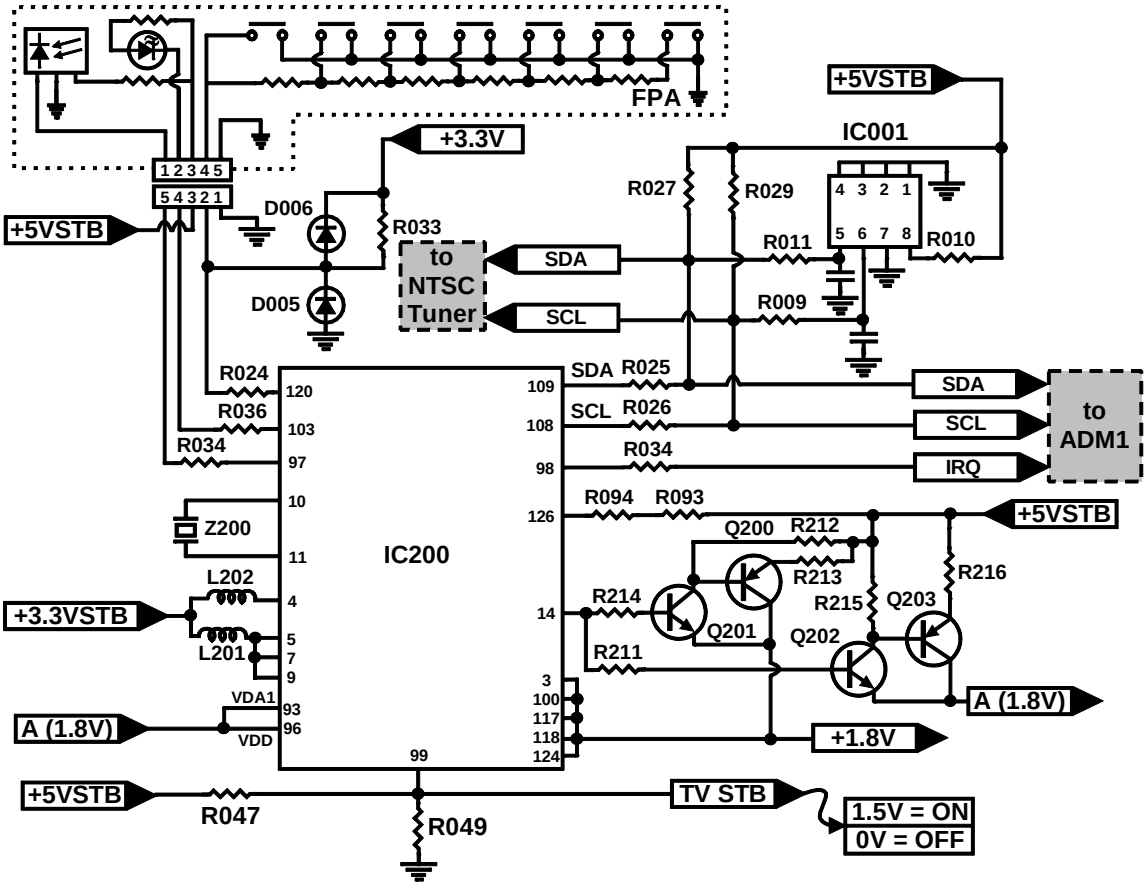


**A/V Processing and Switching**

Another function of IC200 is to switch and process the audio and video signals. All inputs (A/V) are switched and processed by IC200 before the signals are output from the IC. Output from IC200 for video is RGB that is sent to the CRT video drivers. Audio from IC200 is Right and Left signals being sent to the audio output stage.

**User Interface**

IC200 has two lines for user interface; pin 97 and pin120. These two lines allow the user to control functions of the set. Pin 97 is the IR input and Pin 120 is the Key board input. The IR signal is +5V p-p serial information stream detected by the IR sensor. The key board input is a voltage representation of the key being pressed. A series of resistors connected to the +3.3V source make up the voltage divider. Each key switch is connected across a junction in the chain of resistors and ground. When a key is pressed, the voltage drop at that junction is detected by pin 120 of IC200.



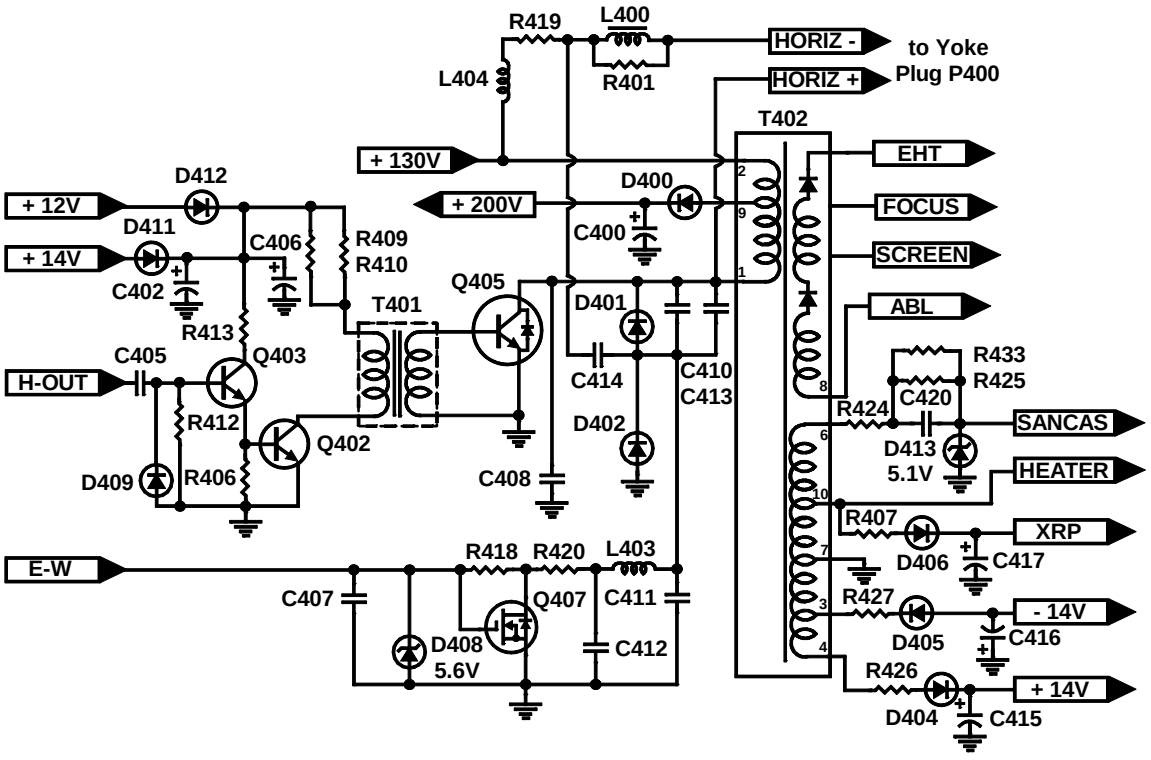
# Horizontal Deflection

The ATC010 horizontal circuit consists of a pre-driver, driver, driver transformer, HOT, E-W circuit, and IHVT. Drive for East / West correction and deflection come from the system control processor (IC200). The purpose of horizontal is to drive the deflection yoke and the IHVT. The IHVT generates the necessary voltages to bias the CRT and the Vertical circuit. Other signals from the IHVT are used by the system control for timing and control. These signals are Automatic Beam Limiter (ABL), Sandcastle (SANCAS), and X-ray Protect (XRP).

Drive for the horizontal circuit comes from the system control (IC200-67) through C405. This drive signal is amplified by Q403 pre-amp before being sent to the driver Q402. Bias for Q403 is through R413 from the +12V initially and then from the +14V after horizontal is operational. Q402 drives the horizontal driver transformer (T401) that is directly connected to the horizontal output Q405. Bias for Q405 is through T402 (IHVT) from the +130V run source.

As Q405 (Horizontal Output Transistor) conducts, current through T402 and the horizontal yoke windings increases. When Q405 stops conducting, energy stored in T402 primary is transferred to the secondaries. The secondary voltages are:

- +200V for CRT cathode
- EHT or High Voltage
- Focus
- Screen
- + / – 14V for vertical and horizontal operation
- ABL or Automatic Beam Limiter

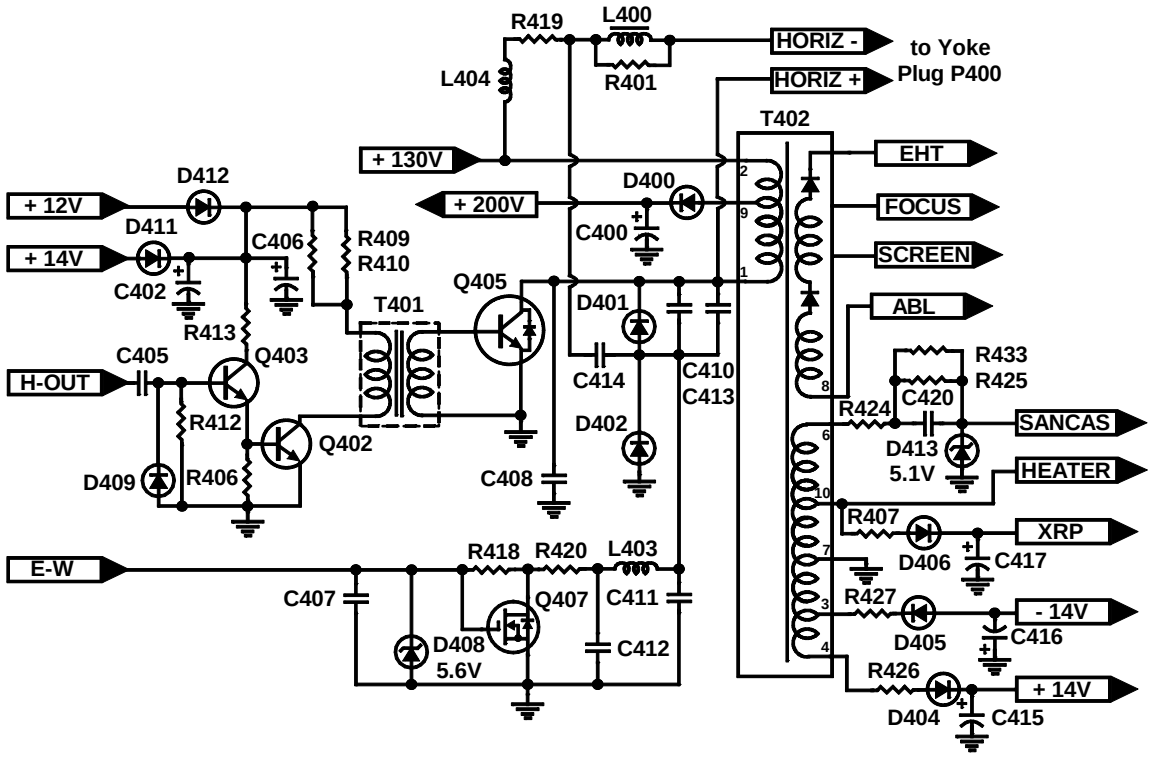


The changing current in the horizontal deflection yoke windings force the beam to move back and forth across the screen. How far (Width) across the screen the beam travels is controlled by the E-W circuit connect to the low side of the deflection yoke.

**E-W Correction**

East West correction starts with drive from IC200 pin 21 going to Q407 gate. Q407 modulates the current flowing it the deflection yoke by changing the waveform present on the low side of the yoke. Bias for Q407 comes from D402, C411 and C412 through L403 and R420.

Width is controlled by Q407s on time. The longer Q407 remains on, the more pulled in the picture will look. Shorter on time creates a wider picture. IC200 digital data (adjustable data) allows adjustment of the width and pin correction through the service menu. These adjustments affect the drive signal going to Q407. See the electronic service data for instructions regarding how to make these adjustments.



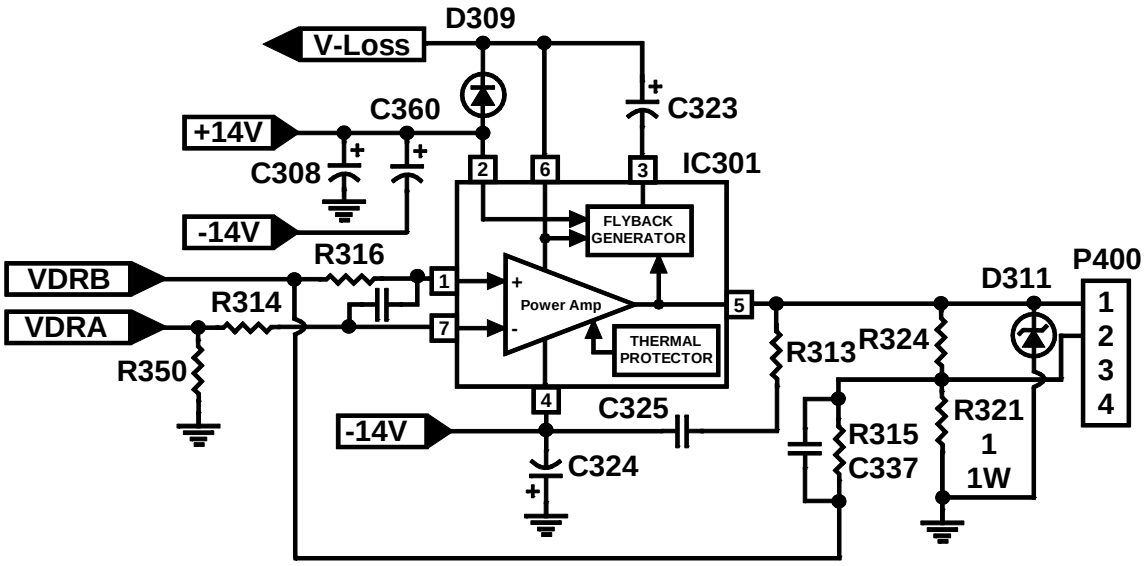
# Vertical Deflection

The ATC010 uses a ramp generator IC200 and deflection booster IC301 to drive the vertical yoke windings. IC301 uses the + and – 14V to generate enough flyback voltage for vertical deflection. Drive for IC301 comes from the system control IC200 and is labeled VDRA and VDRB. Vertical deflection is monitored by V-Loss circuit that forces shutdown the set if vertical deflection is lost.

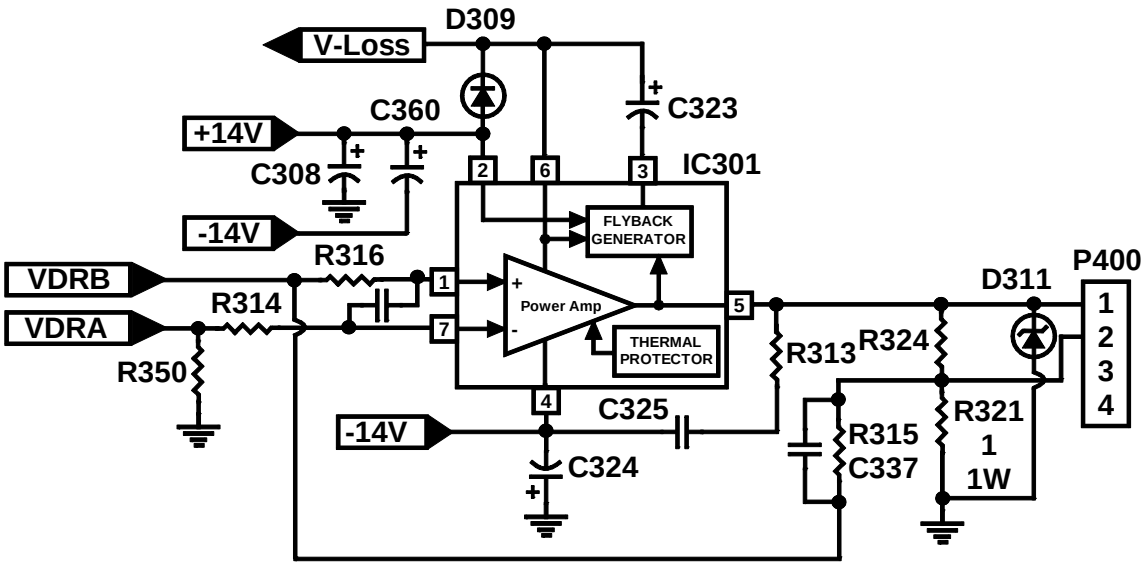
VCC is supplied to pin 2 from the +14V source and the -14V supplies pin 4 of IC301. The +14V source is used through first half of the screen with 0 volts being center of the screen. The second or bottom half is driven by the -14V source. Return or retrace to the top comes from the flyback generator circuit between pins 3 and 6. C323 and D309 assist with the flyback generator to create the voltage necessary to move the beam from bottom of the screen back to top of the screen. This is known as retrace.

During retrace more voltage needs to be applied to the yoke so the beam will return to the top much quicker than when it scanned down. Because the vertical circuit uses two supplies (-14V and +14V) and because retrace must occur in such a short time compared to trace, a higher positive supply is needed. During trace, the negative lead of C323 (pin 3) is connected to the -14V supply internal of IC301. With the positive lead of C323 connected to the +14V supply, there is approximately 28 volts across C323. At retrace, the flyback generator connects pin 3 to pin 2 applying the +14V supply to the negative side of C323. D309 blocks current flow between C323 and the +14V supply. With the stored charge on C323 and the +14V supply on the negative terminal, about +42 volts is supplied to pin 6. The increased voltage quickly retraces the beam to the top of the screen.

Output from pin 5 drives the deflection yoke. The return from the yoke goes to pin 1 as feedback reference through R315 and C337.



Drive for IC301 comes from IC200 and is applied to pins 1(non-inverting input) and 7 (inverting input). These two signals are combined in IC301 to generate the vertical ramp needed to drive the deflection yoke. Protection from residual energy in the vertical yoke windings is provided by R324 and D311. Also in the output circuit is R321. R321 provides ground reference for the low side of the vertical yoke.




# Shutdown

The ATC010 chassis has three deflection type shutdowns Vertical, XRP, and ABL. Each of these shutdowns communicate back to IC200 through the XRP detect pin 119. All the deflection shutdowns are detected as XRP. XRP shutdown is active low.

### Vertical Shutdown

The vertical shutdown is active when loss of vertical deflection occurs. The detection circuit for vertical shutdown consists of D300, D307, D308, C300, C307, C313, and R300. The circuit is designed as a voltage divider between R030 and R300 that is active only when vertical deflection is lost.

With vertical deflection at decoupling capacitor C313, D307 and D308 rectify the vertical pulse, D306 regulates the pulse and C307 filters it. With 3.9V on the anode of D300 it is not conducting. During vertical loss, D300 is forward biased and R300 is in series with R030 creating a voltage divider, dropping the voltage on pin 119 of IC200. This causes the set to shutdown when vertical deflection is lost.

### XRP Shutdown

The XRP circuit monitors the flyback Heater pulse for both excessive and minimal voltage. D406 rectifies the heater pulse from pin 10 of T402 to be used by the XRP circuit. The rectified voltage is in the range of +10V to +30V. Any voltage outside of this range will cause the XRP circuit to trip shutting down the set.

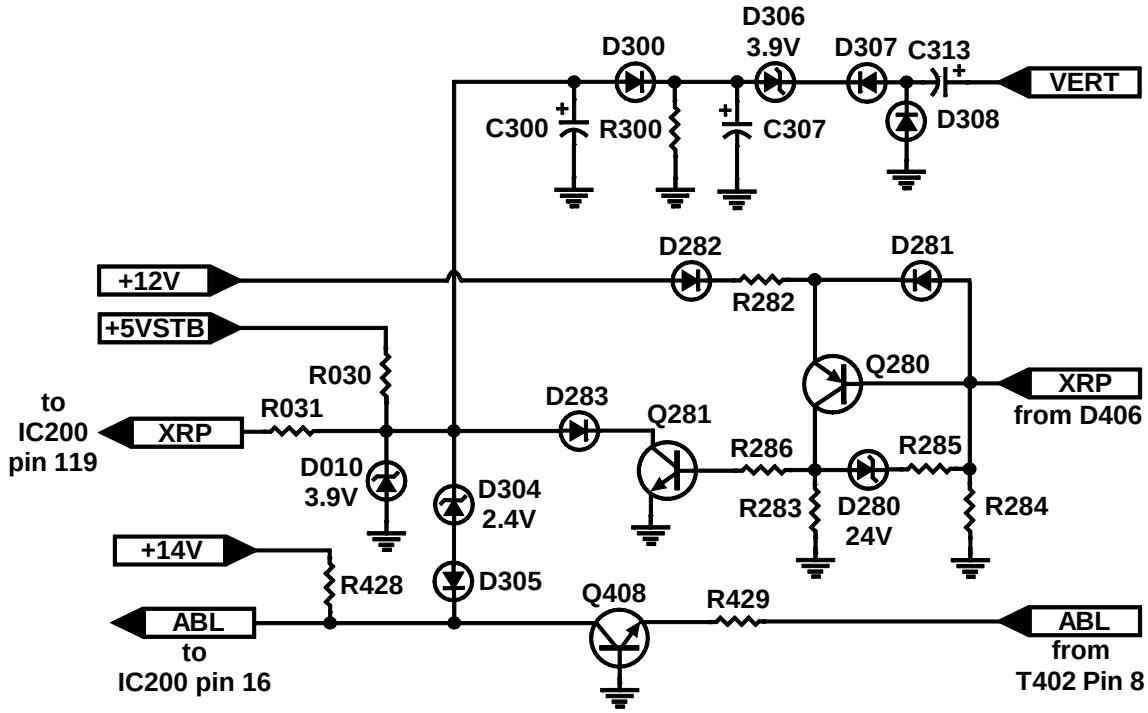
The XRP circuit is made up of two transistors (Q280, and Q280), diodes D280, D281, D282, and D283. A +12V source provides bias to the circuit. Q280 is used to detect the lack of high voltage or high voltage too low. If the voltage on the base of Q280 drops below the emitter voltage of +12V, Q280 turns on and supplies Q281 base with .7Vdc from the +12V source. Q281 turns on pulling the XRP line low making it active and shutting down the set.

For excessive high voltage, D280 (24V zener) is used. As high voltage increases, the voltage from D406 also increases. Once this voltage exceeds the break over voltage of D280, D280 conducts supplying Q281 base with .7Vdc to turn on. Once Q281 turns on, XRP is activated and the set is shutdown.

IC200 will shutdown horizontal drive when the DC voltage on pin 119 (XRP) is less then or equal to 1.9Vdc. Once in shutdown, restart can only be initiated by pressing the power on from remote or key pad.

**ABL Shutdown**

The ABL serves two functions. First, it provides feedback to IC200 to regulate beam current. Second, it provides protection against excessive beam current such as found when the CRT shorts. As beam current increases ABL information is sent to IC200 which in turn limits the output or drive to the CRT. Shutdown occurs when there is enough current flowing in the CRT to lower Q408 collector below ground potential (-Vdc). As ABL becomes more negative, Q408 turns on harder. The positive 3.9V on D304 cathode and a negative voltage on D305 cathode cause both diodes to conduct lowering the XRP voltage and shutting down the set.



# ADM1 Module (ATSC Tuner)

The ADM1 front end is comprised of a terrestrial/cable tuner module and a Link IC (Broadcom). The tuner module consists of a tuner and IF capable of receiving ATSC signals and providing the Link chip with ATSC 8-VSB. The Link chip is responsible for digital demodulation and error correction of 8-VSB and providing a serial transport stream to the ADM1 back end for processing.

The digital decoder function of the ADM1 is performed by the BCM3510 (II101). II101 is a digital receiver compatible with digital terrestrial broadcast television (ATSC A/53) standards. It is capable of receiving all standard-definition and high-definition digital television formats (SDTV/HDTV).

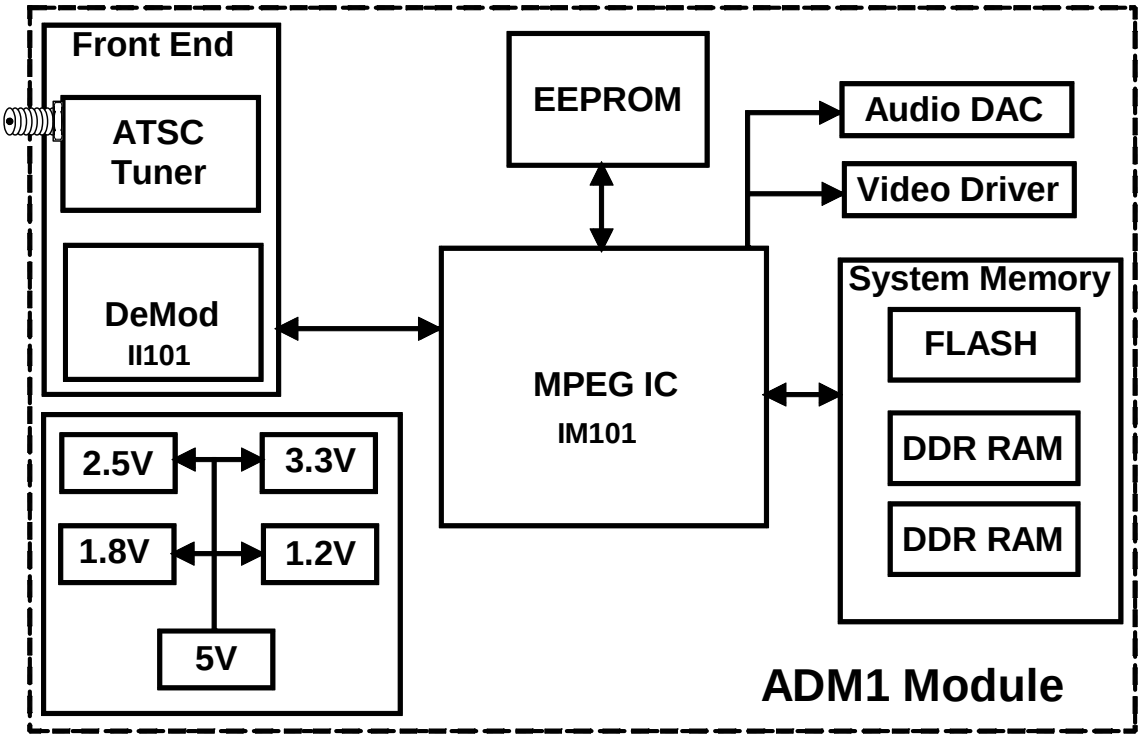
II101 accepts an analog signal centered at the standard television IF frequencies or near baseband signal from the ATSC tuner. The signal is amplified and digitized with an integrated programmable gain amplifier and 10-bit A/D converter. II101 then demodulates and filters the signal with an 8-VSB demodulator and adaptively filters the signal to remove multi-path propagation effects and NTSC co-channel interference before being sent to the MPEG decoder processor.

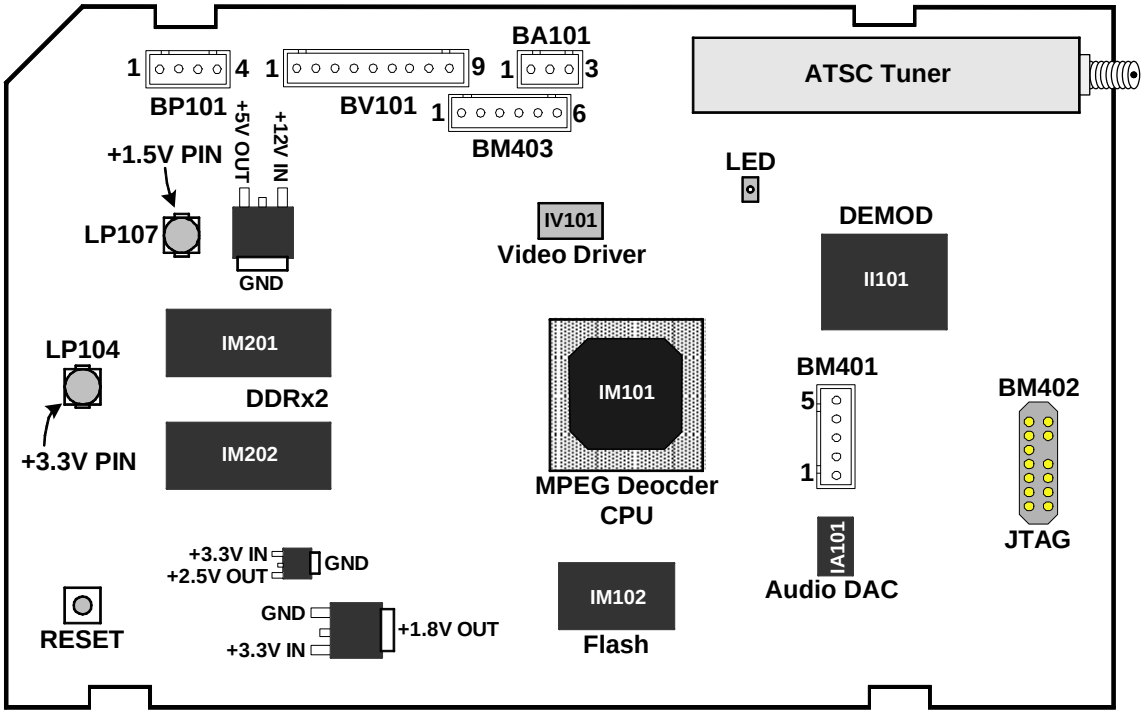
The MPEG decoder (IM101) is a high definition decoder that has a CPU core and transport filtering. IM101 also process the audio from the ATSC tuner. The signals are then output from the ADM1 module as Y Pr Pb on connector BV101. Pins 4, 6, and 8 make up the Y Pr Pb signal respectively with Right and Left audio on BA101.

Other IC's on the ADM1 module are:

- IM201 and IM202 DDR SDRAM for audio and video decoding
- IM102 Flash Memory for MPEG programming
- Power Supply Regulators (+1.5V, +1.8V, +2.5V, +3.3V, and +5V)

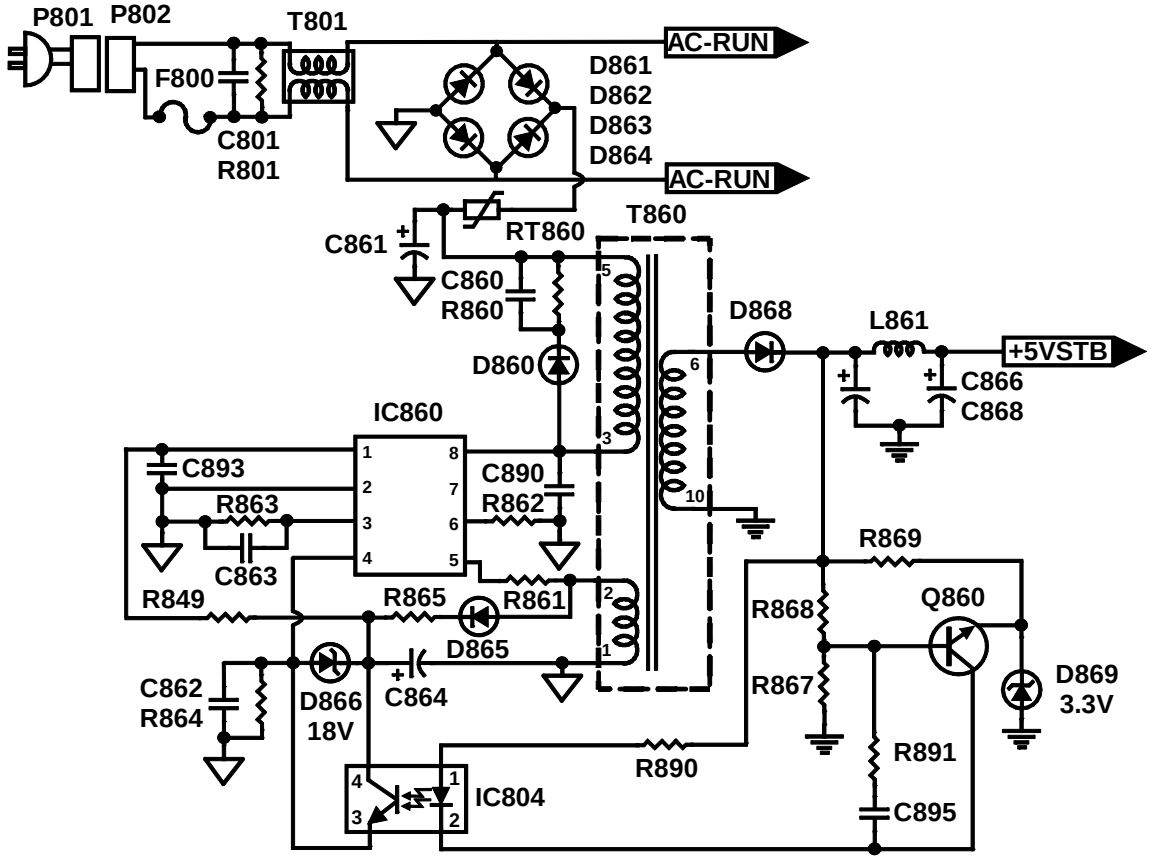
An external power source (+12Vdc found on connector BP101) is used as a source voltage for the +5V regulator.


Front End
ATSC Tuner
DeMod
II101
EEPROM
Audio DAC
Video Driver
MPEG IC
IM101
System Memory
FLASH
DDR RAM
DDR RAM
2.5V
3.3V
1.8V
1.2V
5V
ADM1 Module


BA101
1
4
1
9
1
3
BP101
BV101
1
6
BM403
ATSC Tuner
+5V OUT
+12V IN
+1.5V PIN
LP107
GND
LED
IV101
Video Driver
DEMOD
II101
LP104
IM201
DDRx2
IM202
+3.3V PIN
IM101
MPEG Deocder
CPU
BM401
5
1
BM402
JTAG
+3.3V IN
+2.5V OUT
GND
GND
+3.3V IN
+1.8V OUT
RESET
IM102
Flash
IA101
Audio DAC

# Standby Power Supply Troubleshooting

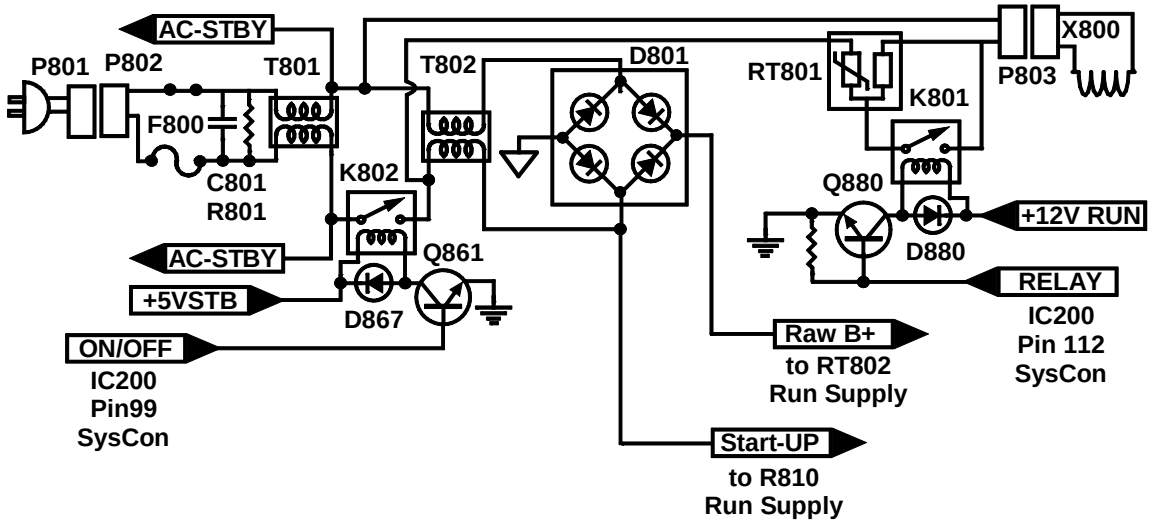
1. Apply AC power and measure the DC voltage on pin 8 of IC860. If the voltage is 160Vdc, go to the next step. If the voltage is low or missing suspect F800, D861-D864, RT860 or T860.
2. Measure the DC voltage on pin 1 of IC860 (9Vdc normal). If voltage is pulsing or low, suspect an over current condition on the secondary side of T860 or re-supply problem from D865 through R849. If voltage is high (above 10Vdc) suspect regulation problem and go to the next step.
3. If the voltage on pin 1 is above 10Vdc and pulsing, check IC804 for proper operation. NOTE: Normal operation of IC804 is as the current between pins 1 and 2 increases; the photo transistor across pins 3 and 4 conducts harder.
4. Measure the DC voltage on pin 4 of IC860. If the voltage is greater than 2.7Vdc, suspect IC860, if the voltage is low, suspect IC804 or a problem in the feedback circuit off the +5VSTB supply. (Q860, D869, R890 etc.) If the voltage is pulsing high above 2.8Vdc, short across pins 3 and 4 of IC804. If the voltage drops and is pulsing suspect feedback problem of D866. If the voltage is pulsing high, suspect IC860.

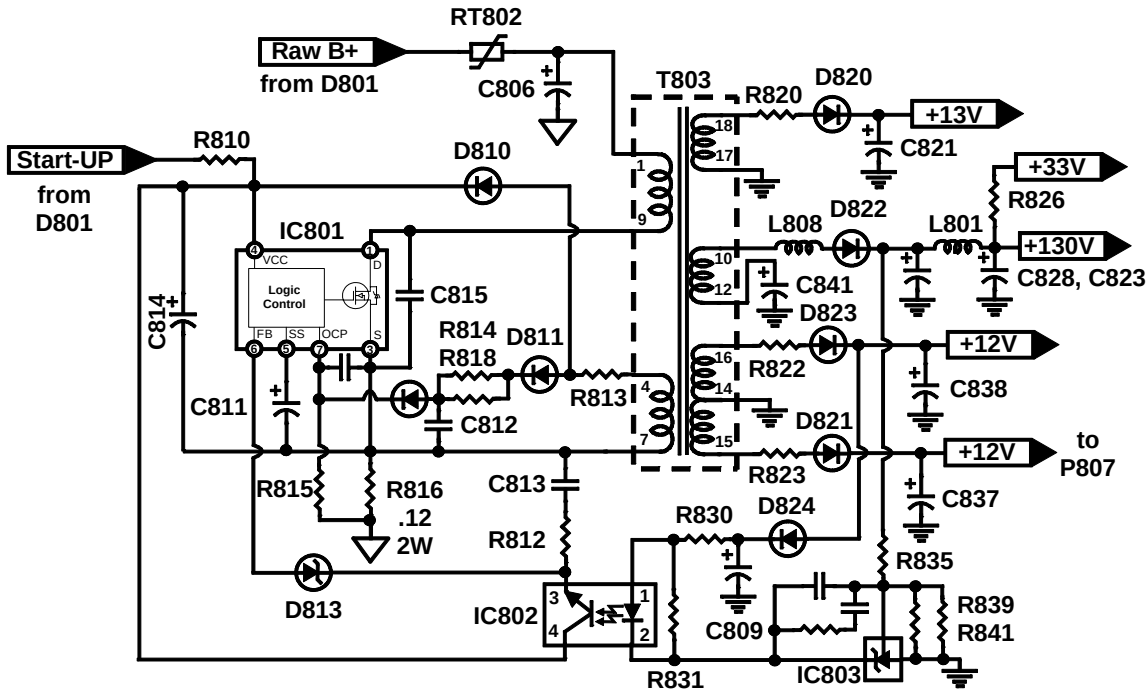


# Run Power Supply Troubleshooting

In order for the run supply to be powered on it is necessary to force on the relay K802. This is accomplished by shorting C-E of Q861 and applying AC power to the set. NOTE: The standby power supply needs to be operational for this to work.

1. With C-E of Q861 shorted together, apply AC power and measure IC801 pin 4 for DC voltage reference to HOT ground. If there is no voltage suspect R810 or D801 bridge rectifier. If voltage is pulsing, go to step 3.
2. Unsolder pin 1 of IC801 and measure the DC voltage on the pad. If the voltage on the pad is equal to or greater than 120Vdc go to the next step. If lower than 120Vdc, suspect RT802, D801, or T803.
3. Reconnect pin 1 of IC801. Apply AC power and see if secondary supplies are pulsing. If all the secondary supplies are pulsing, suspect a feedback or re-supply problem. If any secondary supply is not pulsing but the others are, suspect a problem with the supply that is not pulsing. **NOTE:** The +12V off D823 and the +130V have to be operational for feedback to work properly. A problem with either will result in over voltage shutdown of the supply.
    a. Feed back problem; Monitor the +130V supply and apply AC power. If the supply is pulsing above 130Vdc (reference cold ground), the supply is in over voltage shutdown. Go to step 4.
    b. Re-supply problem; Monitor the voltage on pin 4 of IC801 and apply AC power. If the voltage at pin 4 is pulsing but never goes above 10Vdc, suspect D810, C814, or R813. If the voltage is pulsing between 10Vdc and 17Vdc, go to the next step.
4. Suspect IC803, IC802, R835, R839, R841, D824, D813, and the +12V supply. If still pulsing suspect IC801 or over current condition.





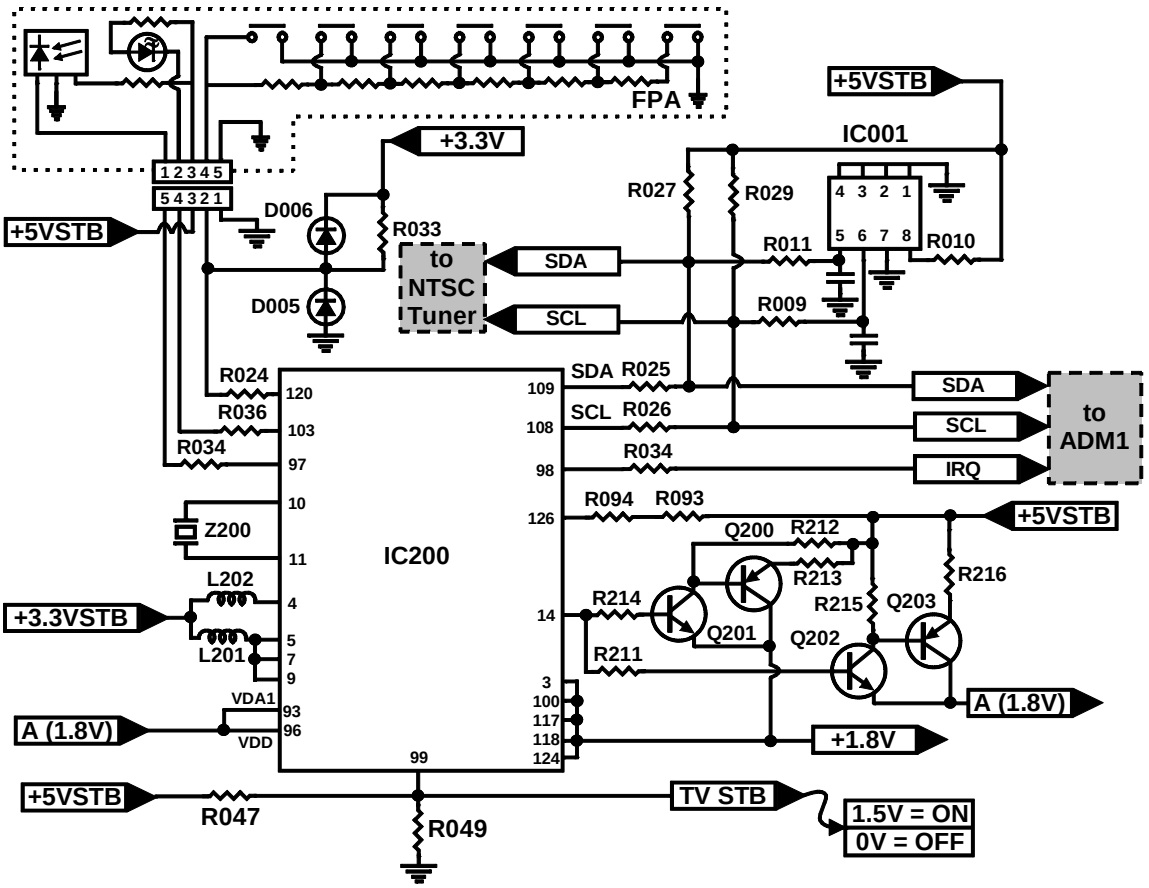

**Feedback Regulation Troubleshooting**

The Feedback regulation circuit in the run supply uses two supply voltages for operation, the +12V and the +130V. The +12V supply is for biasing IC802 and IC803. The +130V is the monitored supply for regulation thus provides IC803 a reference voltage. Testing all active components in the feedback regulation circuit is the best way to troubleshoot it.

# System Control Troubleshooting

There are basic items to check on IC200 that are required for the IC to operate. Not all will be listed in this troubleshooting procedure but general description of them will be indicated.

1. Make sure all standby supply voltages and ground pins are at the correct potential. If missing troubleshoot the appropriate circuit.
2. Check for oscillator on pins 10 and 11. If missing suspect Z200 or IC200.
3. Check for clock and data on pins 108 and 109 when set is first plugged in. If missing suspect IC200 or other device connected to the clock and data lines. (IC001, Tuner, and ADM1) The clock and data need to be 5VP-P in order for communication to occur. Any thing less there is a problem on the lines.
4. Key scan input and IR input. Check for proper voltage (3.3V) on pin 120 of IC200. If the voltage is not 3.3V, suspect one or more of the keys are defective or a problem with the Front Panel Assembly.
5. Check IR input pin 97 for signal. If signal is present, IR sensor problem or noise on the line. Signal is only present when an IR signal is received. Any other time there should be no signal.
6. Monitor pin 99 of IC200 and press the power switch. If the voltage comes up to 1.5V, system control is trying to turn on the set and is functional. If the voltage remains low, IC001 or IC200 are suspect.

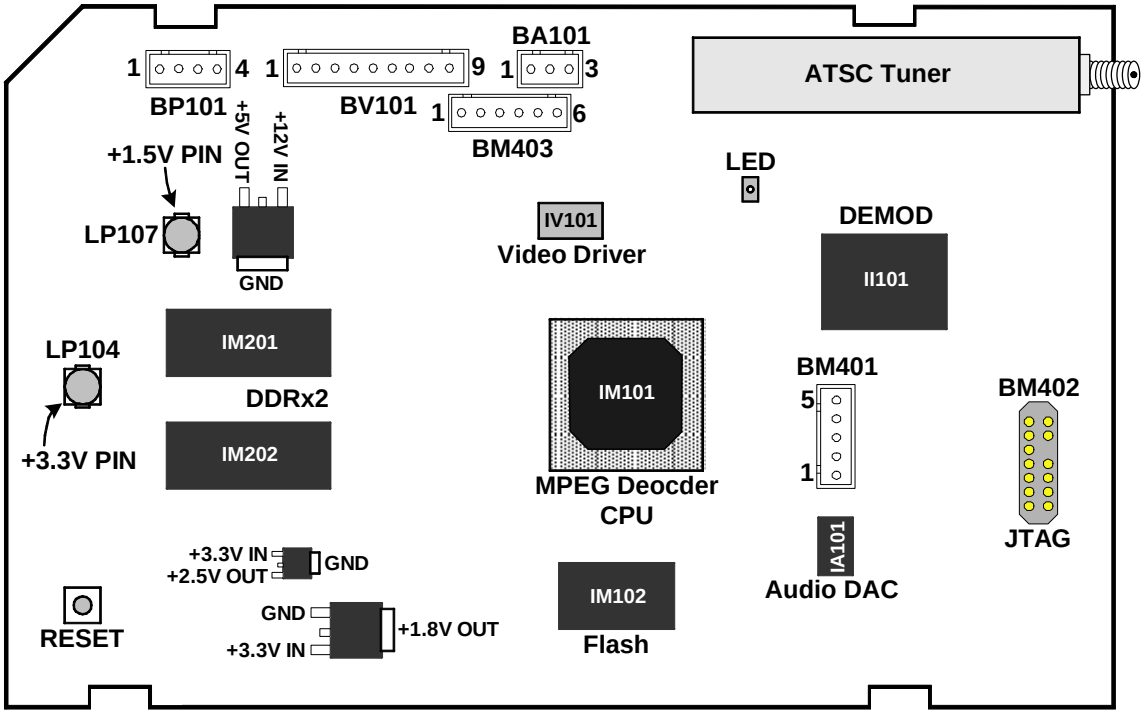


# ADM1 Troubleshooting

Troubleshooting the ADM1 module is in the form of does it have the necessary inputs and is there output from the module. To start troubleshooting all inputs need to be checked.

1. Apply AC power to the set and turn on. Verify the set is working on NTSC station. If not troubleshoot the chassis not the ADM1.
2. Set receives and displays NTSC signals ok, measure the DC voltage on pins 1 and 2 of BP101 on the ADM1 module. +12V present on both go to the next step. If missing troubleshoot the +12V supply.
3. Check for clock and data on pins 1 and 2 of BM403. +5VP-P signal present when changing High Definition channels, go to the next step. Signals missing or low troubleshoot the clock and data lines.
4. Check for output on pins 2, 4, 6, and 8 of BV101. Signals present problem is on the main chassis or with IC200. Signals missing, suspect ADM1 module.

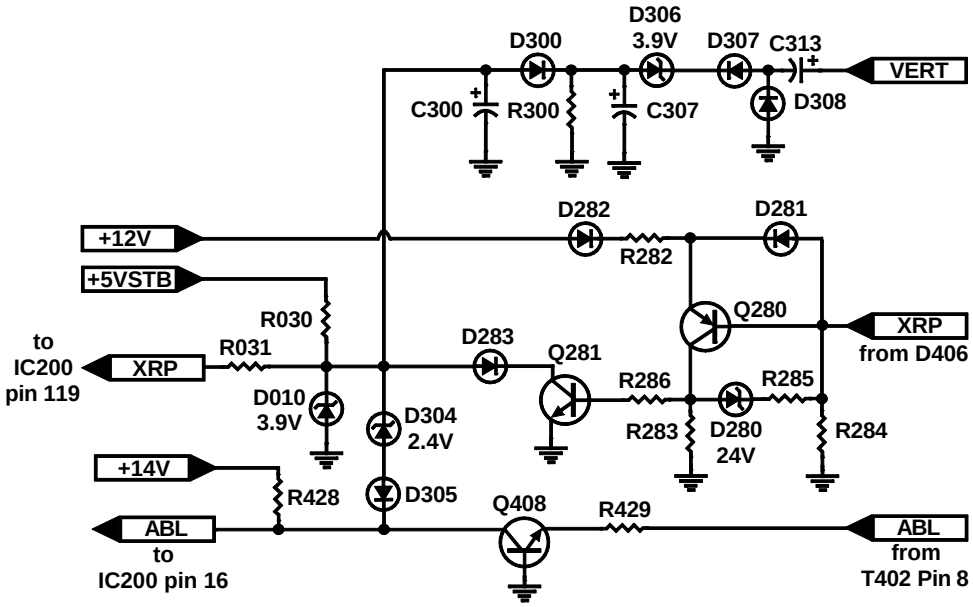
NOTE: audio is on BA101 pins 1 and 3. If audio problem on HD channels is the complaint, check for signal at this connector. If missing ADM1 is suspect. If present the main chassis or IC200 is suspect.



# Shutdown Troubleshooting

With only three shutdowns and the usual power supply shutdowns, troubleshooting the ATC010 chassis shutdown is a mater of eliminating each shutdown. The following steps will use a logical order to determine which shutdown is being activated. Common sense should be used when performing these steps as they disable the shutdown to determine which shutdown is being triggered. NOTE: XRP should never be disabled!

1. Verify both standby and run supplies are working and at proper voltage. For the standby measure the +5V and the +3.3V. If either is low or missing troubleshoot the standby supply. If ok go to the next step.
2. Verify the run supply is working by forcing on the supply. To force on the run supply jumper between E-C of Q861 and measure all supply voltages. If they are low or missing troubleshoot the run supply. If they are ok, go to the next step.
3. Remove the jumper on Q861. Apply AC power and press the power switch. Does the set cycle on and off? If the set is pulsing or cycling on and off, measure the voltage ad the cathode of D010. If the voltage is pulsing below +3V, measure the base of Q281. If there is .7V pulsing on the base of Q281, the set is in XRP shutdown; suspect Horizontal circuit, IHVT, or XRP detect circuit problem. If 0V is on the base of Q281, go to the next step.
4. Unsolder D304 cathode. Apply AC power and press the power switch. If the set starts, ABL shutdown is being activated. Troubleshoot the ABL shutdown. If it still pulses, go to the next step.
5. Unsolder D300 anode. Remove the CRT drive board from the CRT to prevent possible burning of the CRT. Apply AC power and press the power switch. If the set starts, Vertical shutdown is being activated, troubleshoot the vertical circuit. If the set still pulses, suspect XRP or power supply problem getting to the shutdown circuit. Power supply problem with the shutdown circuit, suspect R030, D282, D280, the +5VSTB or the +12V.



# NOTES

TTM_ATC010